POLICY No. 08-01

GUIDELINES FOR THE DETERMINATION OF TREATMENT REQUIREMENTS FOR MUNICIPAL AND PRIVATE SEWAGE TREATMENT WORKS DISCHARGING TO SURFACE WATERS

1.0 RATIONALE

Effluent requirements within the Province of Ontario are determined under the provisions of "Water Management, Goals, Policies, Objectives and Implementation Procedures of the Ministry of the Environment". In accordance with the policies outlined in that publication, effluent requirements are established on a case-by-case basis considering the characteristics of the receiving water body, as well as Federal and Provincial effluent regulations and guidelines, where applicable.

For discharges from municipal and private sewage treatment works, Provincial jurisdiction applies, except for Federal facilities. Federal facilities are covered by the effluent guidelines, "Guidelines for Effluent Quality and Wastewater Treatment at Federal Establishments". Normally, the Federal government consults with the Province to ensure that the effluent from Federal plants will be consistent with Provincial policies.

Policy No. 08-01 takes the approach of establishing a "normal" level of treatment which must be provided, unless individual receiving water assessment studies either indicate the need for higher levels of treatment or suggest that a relaxation of the "normal" level of treatment requirement can be considered. In setting the "normal" level of treatment as secondary, various factors were considered, including: minimization of adverse health-related and environmental effects, aesthetic nuisance and toxic effects of effluent discharges from heavily populated areas to rivers and streams or to littoral zones of lakes where intensive water use and re-use occur; minimization of potential interference of effluent discharges with other water uses; possibility of more stringent future phosphorus removal requirements and the capability of secondary sewage treatment processes to be upgraded to meet such requirements; relatively low additional cost and significant additional benefits of secondary treatment over primary treatment with respect to removal of conventional contaminants and, potentially, the removal of hazardous trace contaminants, such as heavy metals and toxic organics.

2.0 DEFINITIONS

2.1 Municipal and Private Sewage Treatment Works

The term "municipal and private sewage treatment works", for purposes of Policy No. 08-01 and these guidelines, includes works treating either strictly domestic, or combinations of domestic, with commercial or industrial waste, which are owned by municipalities, private groups or companies, institutions or government agencies, and which discharge their effluent to surface waters, but does not include sewage works exempted from the requirement of Section 24 of the OWR Act (R.S.O. 1980).

2.2 Secondary Treatment

Secondary treatment, or equivalent, may be that provided by biological processes including the activated sludge variations or lagoon systems, physical-chemical, or combinations of these processes producing an effluent quality as stated in Section B of the attached Table 1.

3.0 GUIDELINES

In selecting the level of treatment required for municipal and private sewage treatment works discharging to surface waters, the following shall be adhered to:

3.1 Receiving Water Assessment

Receiving water assessments must be performed in all cases. Technical guidance for water assessment studies may be obtained from Regional Technical Support staff or staff of the Water Resources Branch. The carrying out of receiving water assessment studies and the interpretation of results will be the responsibility of the proponent of any new sewage treatment works or of any works undergoing expansion. Any relevant data in the possession of the Ministry will, upon request, be made available for such assessments. In certain cases, the necessary receiving water assessment may have already been carried out by the Ministry and, if so, all pertinent information will be made available to the proponent. If not the Ministry may at its discretion agree to do such assessments, or assist in their completion.

3.2 Relaxation of Normal Treatment

On a case-by-case basis, primary treatment will be permitted, but only after the receiving water assessment results together with other environmental, social and economic factors have been considered and the relaxation of the treatment requirement justified. The onus of justifying a relaxation of treatment requirements rests with the proponent.

Procedures for determining when relaxations from the "normal" levels of treatment may be permitted, are contained in the Ministry Guidelines; "Procedural Guidelines for Relaxation of the Normal Level of Treatment for Municipal and Private Sewage Works Discharging to Surface Waters".

3.3 Higher Than Normal Treatment

If the effluent requirement determined by the receiving water assessment is more stringent than the "normal" level of treatment as required in the Provincial policy, then the treatment requirement derived from the assessment will be imposed.

3.4 Sewage Bypass

Bypassing of raw sewage from nominally separate sewage systems will not be allowed except in emergency conditions.

In accordance with Section 14 of the Environmental Protection Act (R.S.O. 1980), and with Section 16(3) OWR Act (R.S.O. 1980), bypass incidences shall be recorded and the appropriate agencies (i.e. MOE Region, and Medical Officer of Health) notified. In addition, the measured or estimated volume and reasons for bypassing shall be documented.

For new works emergency bypass facilities which permit by-passing from sewers, sewage pumping stations and sewage treatment works of sewage not satisfying the prescribed treatment requirements, must receive approval as required by Section 24 of the OWR Act. It is understood, however, that the approval required is an integral part of normal review procedures for sewers, pumping stations or treatment works in question and that a separate approval is not required. These emergency bypasses will be permitted only to provide protection from basement flooding, to prevent damage to equipment at treatment works or pumping facilities or to prevent treatment process wash-out.

To reduce the frequency and volume of sewage discharged from emergency by-passes to an acceptable minimum, measures shall be taken to provide adequate sewer and pumping station capacity, stand-by equipment, stand-by power, reserve storage capacity in sewers, and/or at treatment facilities and adequate capacity in sewage treatment works. For recommended design criteria, reference should be made to the Ministry of the Environment "Guidelines for the Design of Sewage Treatment Works" and to "Guidelines for the Provision of Equipment to Handle Emergency Conditions in New Sewage Works".

Where existing sewer systems are found to experience excessive infiltration/inflow problems, which result in unacceptable frequencies or quantities of sewage by-passing, and where the above measures alone are either impractical or uneconomical to reduce the by-passing to acceptable levels, staged programs should be developed for the ultimate containment of these flows by a combination of the above measures and the reduction of infiltration/inflow to the sewer systems. These programs should outline the approaches to solving the problems along with the anticipated timing of when the changes to the sewer systems could be made.

3.5 Secondary/Tertiary Facilities With Excess Primary Treatment Capacity

Where infiltration/inflow produces significant sewage flow fluctuations, secondary/tertiary WPCP's may be designed with excess primary treatment capacity to accommodate the extraneous peak flows. This practice will be allowed on a case-by-case basis if receiving water considerations permit. The proponent as part of the water quality assessment must estimate the frequency, quality and quantity of primary effluent discharge and their impact upon water quality.

For the present, effluent criteria need not be specified for excess primary effluent discharged in wet weather. Consequently, no compliance assessment program is currently necessary although excess primary flows should be measured and recorded. The Region in consultation with Water Resources Branch, in specific instances may require both effluent criteria and a compliance assessment program for excess primary effluent discharges. The details of requirements including the means of assessing non-compliance will be specified by the Ministry for such cases.

3.6 Combined Sewer Systems

It is the goal of the Ministry of the Environment to abate all discharges of untreated sanitary wastewater. With combined sewer systems, it is realized that a certain degree of overflowing will occur for some period until total control can be achieved. All municipalities serviced by combined sewerage should however prepare a staged program leading towards the ultimate goal of total containment for treatment of all sewage flows. This program should outline the sewerage works required along with their anticipated timing of implementation. Details of requirements are discussed in the Ministry of the Environment Policy (draft) dealing with by-passing and combined sewage overflows. New or expanded sewage treatment works servicing sewer systems containing combined sewer areas should be designed taking into account the problem of combined sewage overflows.

3.7 Non-compliance of Existing Works

Existing municipal and private sewerage works not complying with Policy 08-01 shall be upgraded to meet the requirement of this policy as soon as possible. It will be the responsibility of the Ministry's Regions to develop upgrading schedules taking into account local, national and international obligations.

3.8 Effluent Design Objectives and Effluent Guidelines

Table 1 is provided to assist in the selection of sewage treatment processes to meet specific effluent quality criteria. Two sets of effluent criteria are given in Table 1 - Effluent Design Objectives and Effluent Guidelines. The Effluent Design Objectives are those levels of performance which can be achieved by treatement processes treating normal strength municipal sewage under optimum conditions. The Effluent Guidelines criteria were developed based upon the effluent quality data of sewage treatment works in operation in Ontario. Sewage treatment works designed in accordance with the Ministry of the Environment "Guidelines for the Design of Sewage Treatment Works" should be able to produce annual average effluent quality approximately equal to the Effluent Design Objectives, but not to exceed the Effluent Guidelines criteria.

There will be some circumstances, when sewage treatment works will be required to achieve somewhat better quality than the Effluent Guidelines criteria in order to satisfy effluent requirements determined from receiving water assessment studies. For example, a situation could occur where the receiving water assessment study for a proposed plant indicates that the effluent BOD_5 should be 17 mg/L and the suspended solids should be 25 mg/L. Plant performance better than the Effluent Guidelines criteria (25 mg/L BOD_5) for conventional activated sludge plants will, therefore, be necessary, but the effluent requirement is still within the possible range for conventional activated sludge plants, since under optimum conditions such a plant should be capable of meeting the Effluent Design Objectives criteria (15 mg/L BOD_5). In this circumstance, a conventional activated sludge plant could be approved with effluent BOD_5 and suspended solids requirements of 17 and 25 mg/L. Reference should be made to the "Procedural Guidelines for the Derivation of Sewage Treatment Works Effluent Requirements and for the Incorporation of Effluent Requirements into Certificates of Approval for New or Expanded Sewage Treatment Works" for the parameters requiring documentation and the procedures required to determine compliance with the effluent requirements.

3.9 Industrial Wastes

In selecting a sewage treatment process, consideration must be given to industrial waste inputs to ensure that the sewage treatment process will be compatible with the waste requiring treatment. Pre-treatment of industrial wastes may be necessary. In all cases, sewer use by-laws should be in effect and under enforcement to control the wastes being discharged to the sewer system by industries.

3.10 Sewage From Pressure or Vacuum Sewer Systems

Special consideration may be required in selecting and designing a sewage treatment process for municipalities serviced either wholly or extensively by pressure or vacuum sewers. The sewage quality tends to be more concentrated in such systems since it is unlikely to be affected by inflow/infiltration.

TABLE 1

EFFLUENT CRITERIA

Treatment Level and Processes	Effluent Design Objectives[α] BOD_5 (mg/L) (unless otherwise noted)	SS (mg/L) (unless otherwise noted)	Total Phosphorus (mg/L) as P	Ammonia + Ammonium Nitrogen (mg/L) as N	Effluent Guidelines[β] BOD_5 (mg/L)	SS (mg/L)
A. Primary Treatment						
- without P removal	30% removal	50% removal	-	-	-γ	-γ
- with P removal	50% removal	70% removal	1.0	-	-γ	-γ
B. Secondary Treatment or Equiv.						
Conventional A.S.						
- without P removal	15	15	-	-	25	25
- with P removal	15	15	1.0	-	25	25
Contact Stabilization						
- without P removal	20	20	-	-	25	25
- with P removal	20	20	1.0	-	25	25
Extended Aeration						
- without P removal	15	15	-	-	25	25
- with P removal	15	15	1.0	-	25	25
Continuous Discharge Lagoon (series operation)						
- without P removal	25	30	-	-	30	40
- with P removal	25	30	1.0	-	30	40
Seasonal Retention Lagoon						
- without P removal	25	30	-	-	30	40
- with P removal by batch chemical dosage	15	20	1.0/0.5	-	25	25
- with P removal by continuous chemical dosage	25	30	1.0	-	30	40
Physical-Chemical Treatment	20	20	1.0	-	25	25

Table 1 cont'd

Treatment Level and Processes	Effluent Design Objectives [α] BOD$_5$ (mg/L) (unless otherwise noted)	SS (mg/L)	Total Phosphorus (mg/L) as P	Ammonia + Ammonium Nitrogen (mg/L) as N	Effluent Guidelines [β] BOD$_5$ (mg/L)	SS (mg/L)
C. Advanced Treatment						
Conventional A.S.						
- with P removal and filtration	10	5	0.3	-	_ [ε]	_ [ε]
- with nitrification	15	15	-	<1.0 [δ]	_ [ε]	_ [ε]
Extended Aeration						
- with P removal and filtration	5	5	0.3	-	_ [ε]	_ [ε]

α Expected effluent quality under optimum conditions when treating raw sewage with BOD$_5$ = 170 mg/L, soluble BOD$_5$ = 50% SS = 200 mg/L, P = 7 mg/L, $NH_3 + NH_4^+$ = 20 mg/L.

β Criteria which the average annual effluent quality should not exceed (based upon performance of sewage treatment works in operation in Ontario).

γ Primary treatment allowed only where receiving water conditions permit. Effluent quality must be estimated on a case-by-case basis for new primary plants. Effluent quality for expansions to existing plants should be based upon past plant performance.

δ Expected warm weather effluent concentration.

ε Effluent quality and permissible periods of discharge will be stipulated as a result of receiving water assessment studies. Where effluent BOD$_5$ and suspended solids concentrations are not found to be critical, then Effluent Guideline BOD$_5$ and suspended solids concentrations of 25 and 25 mg/L should be used.